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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/901,130	07/10/2001	Kazuya Iwamoto	L7016.01122	5796

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EXAMINER	
CREPEAU, JONATHAN	

ART UNIT	PAPER NUMBER
1746	

DATE MAILED: 10/03/2003

8

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/901,130	IWAMOTO ET AL.	
	Examiner	Art Unit	
	Jonathan S. Crepeau	1746	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *10 July 2001* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-24* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-24* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) *5,7* .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other:

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 2, 5, and 23 are rejected under 35 U.S.C. 102(b) as being anticipated by WO 99/30381. Regarding claims 5 and 23, the reference discloses a nonaqueous electrochemical apparatus wherein the surface tension of the electrolyte is 28.7 dynes/cm (see Table 2). Regarding claims 2 and 5, the surface free energy of a solid element (i.e., separator) is between 30 and 35 dynes/cm (see page 2, line 2). Thus, the difference between the free energy of the separator and the surface tension of the electrolyte is less than 10 dynes/cm, as recited in claim 2.

Thus, the instant claims are anticipated.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 1, 3, 4, 6-8, 12-22, and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over WO 99/30381.

The reference is applied to claims 2, 5, and 23 for the reasons stated above. Further, regarding claims 6 and 12, the negative electrode contains carbon (see page 12, line 5). Regarding claims 7, 8, 12, and 17, the electrolyte contains a fluorine-containing surfactant salt (see abstract). Regarding claim 12, the positive electrode comprises a lithium-containing metal oxide (see page 12, line 14). Regarding claims 12, 13, and 15, the electrolyte contains a nonaqueous solvent such as propylene carbonate or gamma-butyrolactone (see page 11, lines 11 and 12) and a solute (see page 3, line 31). Regarding claims 14, 21, and 22, the electrolyte may contain an additive comprising a carbonic acid ester or a sulfur compound (e.g., sulfolane) (see page 11, lines 10 and 16). Regarding claims 15, 16, and 19, the solvent contains a plurality of cyclic carbonic acid esters (i.e., ethylene carbonate and propylene carbonate) and the solute contains lithium (see Example 5). Regarding claim 18, propylene carbonate has a melting point of –49 degrees C. Regarding claim 20, the solute may comprise any of lithium tetrafluoroborate, lithium hexafluorophosphate, lithium bistrifluoromethanesulfonimide, or lithium bispentafluoroethanesulfonimide (see claim 11 of the reference).

The reference does not expressly teach that the surface free energy of the carbon-containing electrode is in the range of 1-35 dynes/cm as recited in claims 5 and 6, or that the difference between the free energy of the electrode and the surface tension of the electrolyte is less than 10 dynes/cm, as recited in claims 1 and 3.

However, the invention as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made because the artisan would be able to surmise from the reference that the surface free energy of the carbon-containing electrode would fall within the claimed ranges. On page 1, line 32 et seq., the reference teaches that "[s]eparators are typically constructed from microporous polyolefin films which can have a surface energy as low as 30-35 dynes/cm. Electrodes are also frequently constructed from hard-to-wet (i.e., low surface energy) materials, including polytetrafluoroethylene and polyvinylidene fluoride binders." The artisan could reasonably surmise from this disclosure that the surface energy of the electrodes of WO '381 is about the same as that of the separator, i.e., 30-35 dynes/cm. Accordingly, the ranges recited in claims 1, 3, and 5 would be rendered obvious.

Regarding the recitation in claim 20 that the solute contains at least one of lithium tetrafluoroborate and lithium hexafluorophosphate and at least one of lithium bistrifluoromethanesulfonimide and lithium bispentafluoroethanesulfonimide, the disclosure of the reference is sufficient to render this subject matter obvious. As noted above, the reference discloses that each of these compounds is useful as a solute. The courts have held that it is *prima facie* obvious to combine two compositions each of which is taught by the prior art to be useful for the same purpose, in order to form a third composition which is to be used for the very same purpose (*In re Kerkhoven*, 205 USPQ 1069 (CCPA 1980)). Accordingly, the subject matter of claim 20 is not considered to distinguish over the reference.

5. Claims 9-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over WO 99/30381 as applied to claims 1, 3, 4, 6-8, 12-22, and 24 above, and further in view of FR 2704099.

WO '381 does not expressly teach that the fluorine-containing surfactant comprises a perfluoroalkylethylene oxide adduct, as recited in claims 9-11.

FR '099 teaches a lithium battery comprising a fluorinated surfactant in the abstract. At the top of page 6, the reference teaches that the surfactant may comprise a perfluoroalkylethylene oxide adduct (i.e., C_6F_{13}-C_2H_4-$O(OC_2H_4)_{12}H$).

Therefore, the invention as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made because the artisan would be motivated to use the surfactant of the French reference in the battery of WO '381. In the abstract, the French reference teaches that the presence of the surfactant in the electrolyte "improves the reactivity of Li with the electrolyte and improves the faradic yield in the process of depositon and redissolution which occurs during the charge and discharge cycles of the battery." Accordingly, the artisan would be motivated to use the surfactant of the French reference in the battery of WO '381.

Regarding the formulas recited in claims 10 and 11, the disclosure of the French reference is sufficient to render these formulas obvious. The claimed formulas each contain C_mF_{2m+1}, SO_2N, C_nH_{2n+1}, and OC_2H_4 groups. As noted above, the formula of the French reference contains C_mF_{2m+1}, C_nH_{2n+1}, and OC_2H_4 groups. Furthermore, the SO_2N group is disclosed throughout the French reference as being useful in the surfactant compositions (see

page 5, lines 24 and 27; page 6, lines 1 and 26). Thus, the use of the SO_2N group in the C_6F_{13}-C_2H_4-$O(OC_2H_4)_{12}H$ surfactant of the French reference would be obvious to a skilled artisan. Furthermore, while the stoichiometric amounts of each group are not identical to the amounts recited in the formula of claim 10, a *prima facie* case of obviousness may still be made because an artisan would have an expectation that compounds similar in structure will have similar properties. See MPEP §2144.09. Accordingly, the formulas of claims 10 and 11 would be rendered obvious to a skilled artisan.

Conclusion

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jonathan Crepeau whose telephone number is (703) 305-0051. The examiner can normally be reached Monday-Friday from 9:30 AM - 6:00 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Randy Gulakowski, can be reached at (703) 308-4333. The phone number for the organization where this application or proceeding is assigned is (703) 305-5900. Additionally, documents may be faxed to (703) 872-9310 (for non-final communications) or (703) 872-9311 (for after-final communications).

Any inquiry of general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

JONATHAN CREPEAU
PATENT EXAMINER
ART UNIT 1746

JSC

September 24, 2003